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ABSTRACT

This study was designed to assess the conceptual structure of the Task of Public Education Opinionnaire (TPE). Since the development of the instrument, several psychometric techniques have been formulated. Two of those methods, image component and alpha factor analysis, were applied to the items of the TPE after the correlation matrices were subjected to tests for psychometric adequacy. The results subsequent to orthogonal and oblique transformation identified three strong dimensions: (1) productive, (2) intellectual, and (3) personal-social. It was recommended that additional items be added to the TPE and that some of the personal and social valuables be combined. The conceptual structure of the instrument, however, was verified by the analysis. (Author)

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A FACTOR ANALYTIC INVESTIGATION OF THE TASK OF PUBLIC EDUCATION

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Background

Some insights into American expectations for schools were provided by the work of Downey, Seager and Slagle (1958) in their study of the tasks of public education. Their study was based upon sixteen items derived through a review of the literature and synthesized into four major conceptual dimensions (Table I). The initial work was based upon a sample of 1,286 educators and 2,544 noneducators in fifteen selected communities throughout the country. Getzells, Lipham and Campbell (1968) raised a question relative to the sampling of subjects and its representativeness of the country as a whole. They also suggested additional considerations.

> "Even if the methodological difficulties were not as real as they are, today's data in this domain might not hold tomorrow in view of the dynamics of current technological and social change."

They also stated, however, that the data were possibilities of which educational administrators should be aware.

Seager (1959) found the intellectual dimensions to dominate the expectations of both educators and noneducators for elementary and secondary education. He was able, however, to identify substantial disagreement between those groups for the other dimensions. Slagle (1959) found considerable disparity among priorities for noneducators when they were stratified into the following occupational categories: professional, semi-professional, managerial, clerical, skilled labor and unskilled labor. Seager (1959) found varying expectations when educators were classified according to educational level. Specifically he indicated that persons with more education placed high valuation upon the intellectual dimensions

in addition to aesthetics and emotional stability. Recently Dziuban, Streeter and Armstrong (1972) applied Guttman's Scalogram model to the items of the T.P.E. but were unable to develop acceptable reproducibility coefficients. They concluded that the items of the instrument did not comprise an attitude scale, at least in the Guttman sense. It seems clear that for the purposes of several studies the adequacy of the T.P.E. items has been assumed. It was the purpose of this investigation to provide evidence regarding that assumption and to assess the hypothesized pattern of the instrument.

Data Collection and Methods

The subjects for the study included two hundred fifteen teachers and school administrators in Central Florida. Their areas of specialization ranged over elementary, secondary, physical education, and the principalship. The procedure was intended to sample a cross section of disciplines. The sixteen items developed by Downey, Seager and Slagle were used as the bases for the instrument. The subjects were asked to respond to a "Likert-type" scale indicating the degree to which they felt each item was a task of public education for both elementary and secondary education.

Correlations were computed among the items for elementary and secondary education. Prior to the application of factor analytic procedures those matrices were assessed for psychometric adequacy with three procedures:

1. Bartlett's test of Sphericity (Tobias and Carlson, 1969) -- The test statistic is computed by the formula $-\left((N - 1) - 1/6\ (2P + 5) \right) \log_e |R|$ where N is the sample size, P is the number of variables and $|R|$ is the determinant of the correlation matrix. For large N the statistic

is approximately distributed as chi square with 1/2 P (P - 1) degrees of freedom and has the associated hypothesis that the sample correlation matrix came from a multivariate normal population in which the variables of interest are independent.

2. Inspection of $S^2R^{-1}S^2$ (Kaiser, 1963) - Psychometric theory indicates that if the off diagonal elements of the anti-image covariance matrix ($S^2R^{-s}S^2$) are close to zero, the factor analytic model may be appropriate. The S^2S are defined as the reciprocals of the diagonal elements of R^{-1}. This is based on the Guttman theorem which states that R^{-1} should be near diagonal if the factor model is appropriate. The matrix $S^2R^{-1}S^2$ comprises the covariances of the unique parts of the data. Kaiser stated:

> "The preceeding material suggests that G, the image covariance matrix, might well be a good approximation to R - U^2, the so called reduced correlation matrix. (Actually the covariance matrix of the common parts of the tests.) How can we tell if this approximation is good? Most simply by looking at the off-diagonal elements of the anti-image covariance matrix Q...In this case if our N is essentially infinite, we have a comprehensive selection of tests from the universe of tests. If, on the other hand, Q is not near-diagonal, we know that the approximation is poor. However, when this occurs, we have evidence that factor analysis is perhaps not appropriate for the data at hand. We may not have thoroughly covered the universe under consideration or that the factor analytic model may not even apply as N ."

3. Recently Kaiser (1970) reported the development of a measure of sampling adequacy:

The index is defined as

$$\text{M.S.A.} = 1 - \frac{\sum_{j \neq k} \sum g_{jk}^2}{\sum_{j \neq k} \sum r_{jk}^2}$$

where the g's are the squares of the off-diagonal elements of $S\,R^{-1}S$, the correlations of the anti-images, and the r's are the original correlations. The corresponding M.S.A. for an individual variable is

$$\text{M.S.A. } (J) = \left] - \frac{\sum_{j \neq k} g_{jk}^2}{\sum_{j \neq k} r_{jk}^2}\right.$$

The overall index presents an assessment of whether the matrix should be factor analyzed. The individual indices indicate whether the variables psychometrically belong to the "family."

Upon assessment of the adequacy of the matrices they were analyzed utilizing two procedures:

1. Image Component Analysis - The procedure due to Guttman is based upon the image covariance matrix $R + S^2 R^{-1} S^2 - 2S^2$. Components were retained according to the eigenvalues greater than unity, the strong lower bound.

2. Alpha Factor Analysis which is based upon the correlation matrix reduced with uniqueness and rescaled with communality $H^{-1}(R-U^2)H^{-1}$. The procedure produces factors with maximum generalizability in Cronbach's Alpha sense. The raw pattern coefficients were orthogonally rotated according to the normal varimax criterion and obliquely using the direct oblimin procedure (Delta=0). Pattern coefficients absolutely greater than .4 were used for interpretation purposes.

Results of the Tests For Psychometric Adequacy

The Bartlett test led to a clear rejection for both the secondary and elementary correlation matrices. The respective determinants were .0009 and .0151 -- a condition which would produce a very low associated probability. The anti-image covariance matrices are presented in tables II and III. Forty-two of the 240 off-diagonal elements of $S^2R^{-1}S^2$ for secondary education were not zero to the first place, while fifty-eight

of the elementary matrix elements exhibited that characteristic. Those elements were generally minimal, however, so that one might assume that $S^2R^{-1}S^2$ approached a diagonal matrix in both cases.

The overall M.S.A.'s for the secondary and elementary matrices were .79 and .71 respectively. Those values according to Kaiser's calibration fall into the acceptable (FAIR) range. The individual M.S.A.'s for the matrices are presented in Table IV. It may be noted that only one variable, "Communication of Knowledge," did not meet the acceptability criterion for the secondary responses while nine variables failed to meet that criterion for elementary responses: "Possession of Knowledge," "Communication of Knowledge," "Desire for Knowledge," "Man to Country," "Man to World," "Physical Health," "Emotional Health," "Vocation-Selective," "Vocation-Preparative."

Results of the Image Analysis

The derived components (normal varimax) for the secondary education responses are presented in Table V. Eight were retained for rotation but upon transformation only three were interpretable. The first component was dominated by the productive variables: "Vocation-Selective," "Vocation-Preparative," "Home and Family" and "Consumer-Preparation." One personal dimension, "Aesthetic Judgment" was positively correlated with this component but it generally emerged as the productive dimension. The second component showed a strong positive relationship to intellectual and social variables: "Possession of Knowledge," "Communication of Knowledge," "Creation of Knowledge," "Desire for Knowledge" and "Civic Rights and Responsibilities." The third component exhibited high positive

correlations with variables related to the social and personal dimensions: "Man to Country," "Physical Health," "Emotional Health" and "Moral Integrity." The orthogonal image solution for secondary education produced three general dimensions: "Productive," "Intellectual-Social," and "Personal-Social."

The pattern coefficients for the oblique solution are presented in Table VI. It may be observed that under that transformation only one component maintained its interpretability -- it was obviously the productive dimension. High coefficients were exhibited for: "Vocation-Selective," "Vocation-Preparative," "Home and Family" and "Consumer Knowledge."

The normal varimax image pattern matrix for the elementary responses is presented in Table IX. The first component was again productive in nature: "Vocation-Selective," "Vocation-Preparative," "Home and Family" and "Consumer Knowledge." The second component turned out to be a "Social-Personal" dimension with saliant loadings on: "Man to State," "Man to Country," "Physical Health," "Emotional Health," "Moral Integrity" and "Aesthetic Pursuits."

The oblique transformation (Table X) of the image pattern for the elementary responses approximated three dimensions. The first was a personal component with "Emotional Health" and "Moral Integrity" ($qj = -.35$). The second component was also productive: "Vocation-Selective," "Vocation-Preparative," and "Consumer-Knowledge." The third was intellectual, composed of "Possession of Knowledge" and "Communication of Knowledge" ($qj = -.35$).

Results of the Alpha Factor Analysis

The results of the orthogonal alpha solution (normal varimax) for secondary responses are presented in Table XIII. Four factors were retained but only two were interpretable upon transformation. The first factor was highly correlated with the productive variables: "Vocation-Selective," "Vocation-Preparative," "Home and Family" and "Consumer-Knowledge." The second was a "Social-Personal" dimension with substantial coefficients on "Man to Country," "Physical Health" and "Moral Integrity."

The obliquely derived alpha factors for secondary education are presented in Table XIV. Four were retained for transformation but only three were interpretable. Factor one exhibited high positive coefficients on the intellectual and social dimensions: "Possession of Knowledge," "Communication of Knowledge," "Creation of Knowledge," "Desire for Knowledge," "Man to State" and "Man to World." The second factor was dominated by productive variables with one personal variable positively correlated, "Aesthetic Pursuits," "Vocation-Selective," "Vocation-Preparative," "Home and Family" and "Consumer Knowledge." The third factor emerged as a "Social-Personal" dimension being highly positively correlated with "Man to Country," "Physical Health," "Emotional Health" and "Moral Integrity."

The orthogonal (normal varimax) pattern for the elementary responses are presented in Table XVII. The first factor was once again a productive dimension, i.e., "Vocation-Guidance," "Vocation-Preparative," "Home and Family" and "Consumer Knowledge." The other factors, although not interpretable according to the .4 criterion, clearly tended toward the remaining categories: "Personal," "Social," and "Intellectual."

The oblique solution for elementary education (Table XVIII) produced four interpretable factors. Again the first was a social-personal dimension: "Man to State," "Man to Country," "Physical Health," "Emotional Health" and "Moral Integrity." The second factor was clearly productive in nature: "Vocation-Guidance," "Vocation-Preparative," "Home and Family" and "Consumer Knowledge." The third factor was intellectual in nature: "Possession and Communication of Knowledge." The fourth factor was a social personal dimension: "Cooperation in Day-to-Day Relations," "Man to World," and "Aesthetic Pursuit."

Discussion

It was intended in this study to assess the psychometric adequacy of the T.P.E. items as well as to validate their conceptual structure. For the present we have ignored the problem of making a statistical inference from a sample of individuals -- a question which is extremely important if one is to infer with some degree of accuracy the task of public education. We have turned our attention to determining whether the items under consideration comprise an adequate sample from a hypothetical domain -- a problem which we consider to be of equal importance and one to which little attention has been paid in the past.

Downey, Seager and Slagle using the items which they developed conceptually did identify variability among various subpublics. Often, however, the magnitude of those differences was obscured since they adhered to the ordinal component of their data. We have not tried to document that variability but instead the bases for it, even though our procedures were based upon a "not so good" sample of subjects. We used two factor analytic procedures in searching for a solution which was

robust with respect to the methods utilized. It seems reasonable that if Downey, Seager and Slagle were correct that we should be able to reproduce their results with both image and alpha analyses. Care was taken, however, to determine the quality of the matrices prior to the analysis -- a step which seems not only reasonable but necessary if one is to be confident in his findings.

Our results seemed to indicate several things, some of them encouraging, some of them not so encouraging. The tests for psychometric adequacy which we utilized unanimously put our matrices in the "fair" range. This leaves us in the perplexing position of having data in which we cannot have overwhelming confidence but which have properties too strong to ignore. This seems to be the perennial fate of researchers in administration who work with Likert-type scales. The factor analyses of the data showed that many of the T.P.E. items, especially those for elementary education have larger unique parts than communality -- a result which is something more than a mild irretant.

Still in all, our results bring out some points which are of considerable importance. It seems clear that the productive dimension was the dominant factor in the T.P.E. for both secondary and elementary education. Those items emerged each time as the strongest configuration and accounted for much of the variance in our sample. In terms of common factors the T.P.E. is highly correlated with an emphasis on production. In our study the intellectual dimension "placed" -- in almost every solution. That is, it came in second in terms of strength. Obviously it is an important common factor and one which Downey, Seager and Slagle

correctly assembled in their original work. Its importance though is recorded only after the strength of "productivity" is noted.

The personal and social dimensions no longer maintained their integrity with our sample. They interacted to form a more generalized "personal-social" dimension which may have its foundation in the recent changes in our society. At any rate we suspect that there may be few reasons to score those dimensions separately on the task of public education opinionnaire as it is presently formulated. Items which force much finer distinctions would be necessary if those areas were again to be separated.

Generally we have been able to reproduce the originally hypothesized dimensions of the Task of Public Education Opinionnaire. They were, however, the previously documented discrepancies which did arise. It seems to us that three major dimensions comprise its pattern: "Productive," "Intellectual" and "Personal-Social." We expect that some changes have occurred in the expectations for public education in the past fifteen years -- possibly to the extent that new dimensions have emerged. In any case, the T.P.E. as it presently stands provides at least a bases for the assessment of those expectations and still comprises possibilities of which educational policy makers and administrators should be aware.

REFERENCES

Downey, Lawrence W., Roger C. Seager and Allen T. Slagle. The Task of Public Education Opinionnaire. Chicago: Midwest Administration Center, University of Chicago, 1958.

Dziuban, Charles D., Richard B. Streeter and John H. Armstrong. "The Task of Public Education As An Attitude Measure: A Guttman Scaling." Paper presented at the Annual Meeting of The Florida Educational Research Association, Ft. Lauderdale, January, 1972.

Getzels, Jacob W., James M. Lipham and Ronald F. Campbell. Educational Administration As A Social Process: Theory, Research, Practice. New York: Harper and Row, 1968, pp. 157-182.

Kaiser, Henry F. "A Second Generation Little Jiffy." Psychometrika. 35, December 1970, 401-415.

Kaiser, Henry F. "Image Analysis," In Problems in Measuring Change. C. W. Harris (Ed.), Madison: The University of Wisconsin Press, 1963, 156-166.

Seager, Roger C. "The Task of the Public School as Perceived by Proximity Subpublics." Unpublished Ph.D. Dissertation, University of Chicago, 1959.

Slagle, Allen T. "The Task of the Public School as Perceived by Occupation and Age Subpublics." Unpublished Ph.D. Dissertation, University of Chicago, 1959.

Tobias, Sigmund and J. E. Carlson. "Brief Report: Bartlett's Test of Sphericity and Chance Finding in Factor Analysis." Multivariate Behavioral Research, 1969, 4, 375-377.

TABLE I

THE TASK OF PUBLIC EDUCATION DIMENSIONS

A. Intellectual Dimensions

1. Possession of Knowledge: A fund of information. Concepts.
2. Communication of Knowledge: Skill to acquire and transmit.
3. Creation of Knowledge: Discrimination and Imagination. Weighing facts as bases for conclusions.
4. Desire for Knowledge: A love for learning.

B. Social Dimensions

5. Man to Man: Cooperation in day-to-day relations.
6. Man to "State": Civic rights and duties.
7. Man to Country: Loyalty to one's own country.
8. Man to World: Interrelationships of peoples.

C. Personal Dimensions

9. Physical: Bodily health and development.
10. Emotional: Mental health and stability.
11. Ethical: Moral integrity.
12. Aesthetic: Cultural and leisure pursuits.

D. Productive Dimensions

13. Vocation-Selective: Information and guidance.
14. Vocation-Preparative: Specific training and placement.
15. Home and Family: Housekeeping, do-it-yourself, family.
16. Consumer: Personal buying, selling, and investment. Budgeting.

TABLE II

ANTI IMAGE COVARIANCE MATRIX
SECONDARY RESPONSES

(Decimals Omitted)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Poss. of Know.	-														
Comm. of Know.	-18	-													
Creat. of Know.	-07	-12	-												
Desire for Know.	02	-10	-15	-											
Coop. in Day to Day Rel.	12	-13	01	00	-										
Man to State	-10	03	-03	-06	-16	-									
Man to Country	-08	-04	02	03	-03	-15	-								
Man to World	-02	-05	02	-12	-08	-10	02	-							
Physical	-01	-03	-03	-04	-00	01	-10	-03	-						
Emotional	02	-04	00	-05	-11	-00	03	06	-15	-					
Ethical	00	-02	01	-03	-00	-03	-14	-10	-02	-16	-				
Aesthetic	-01	-06	-13	03	-02	03	-02	-14	-02	-04	-06	-			
Voc. Guid.	-05	00	-04	-01	-03	-04	-01	-07	-04	-09	06	-02	-		
Voc. Prep.	-02	-04	00	02	-04	-02	05	01	04	02	-03	-02	-00	-	
Home and Family	-02	09	-03	03	00	-02	-06	-05	-10	02	-04	-04	03	-15	-
Consumer	-02	03	-06	-04	03	01	-04	-04	-02	04	04	-12	-06	-07	-13

TABLE III

ANTI IMAGE COVARIANCE MATRIX (Decimals Omitted)
ELEMENTARY RESPONSES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Poss. of Know.	-														
Comm. of Know.	-17	-													
Creat. of Know.	-07	-12	-												
Desire for Know.	-08	-13	03	-											
Coop. in Day to Day Rel.	-04	-02	01	-09	-										
Man to State	-03	-11	-04	01	01	-									
Man to Country	-17	06	03	-02	-09	18	-								
Man to World	00	-03	-10	-11	-16	-08	02	-							
Physical	10	00	-16	-12	-09	01	-11	09	-						
Emotional	-11	03	02	11	-11	-05	07	-02	-12	-					
Ethical	04	-03	-05	-10	-00	-05	-14	09	-01	-18	-				
Aesthetic	05	05	-07	-02	-08	-05	-03	-10	-04	-10	-05	-			
Voc. Guid.	01	04	03	00	-02	05	03	00	-04	04	-04	-06	-		
Voc. Prep.	00	-09	-05	00	-01	06	-03	-04	06	-06	05	02	-26	-	
Home and Family	02	-06	03	08	12	-05	00	-10	-13	00	-06	-00	-05	-01	-
Consumer	-02	-05	-02	10	04	-01	00	-01	-04	-00	-01	-08	-10	-11	-15

TABLE IV

INDIVIDUAL M. S. A.'s FOR THE
SECONDARY AND ELEMENTARY VARIABLES

	Secondary	Elementary
Poss. of Know.	74	55
Comm. of Know.	69	62
Creat. of Know.	77	77
Desire for Know.	73	47
Coop. in Day to Day Rel.	80	73
Man to State	84	81
Man to Country	82	67
Man to World	79	67
Physical	83	66
Emotional	73	68
Ethical	83	75
Aesthetic	85	87
Voc. Guid.	74	65
Voc. Prep.	70	56
Home and Fam.	84	71
Consumer	84	81

(Decimals Omitted)

TABLE V

DERIVED (NORMAL VARIMAX) PATTERN MATRIX IMAGE
PROCEDURE FOR SECONDARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	20	47	22	-08	11	-10	04	-00
Comm. of Know.	17	56	25	10	-02	-10	02	-00
Creat. of Know.	21	50	17	-01	-04	02	00	00
Desire for Know.	13	52	19	05	-00	08	-03	-00
Coop. in Day to Day Rel.	30	34	33	27	03	02	-01	00
Man to State	29	47	38	10	22	03	-01	01
Man to Country	19	35	54	-01	20	-00	00	00
Man to World	32	48	22	10	10	15	01	-00
Physical	19	25	52	-00	-02	02	00	-01
Emotional	34	19	51	15	-09	04	02	01
Ethical	19	29	56	05	05	03	01	01
Aesthetic	45	28	33	-01	-01	03	03	00
Voc. Guid.	63	32	13	14	01	-04	01	01
Voc. Prep.	68	21	13	09	04	02	-02	01
Home and Family	53	15	35	-07	09	07	-02	-02
Consumer	57	17	32	-03	-01	01	02	-01
Eigenvalue	12.8	2.9	3.3	1.6	1.5	1.4	1.08	1.04
Percent of Component Variance	51.4	12.0	9.4	6.8	6.1	5.7	4.4	4.2

(Decimals Omitted)

TABLE VI

DERIVED (OBLIMIN) PATTERN MATRIX IMAGE
PROCEDURE FOR SECONDARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	-00	-06	01	02	-02	-46	01	09
Comm. of Know.	00	-01	-02	20	02	-23	-03	30
Creat. of Know.	01	-06	-02	02	-05	-07	04	46
Desire for Know.	-04	01	-01	00	01	00	-04	53
Coop. in Day to Day Rel.	-21	-13	-10	23	02	-00	-11	08
Man to State	-23	-12	-07	01	05	-30	-12	06
Man to Country	-12	02	-20	-02	-04	-36	-18	02
Man to World	-28	-10	04	02	-06	-08	-02	26
Physical	-00	02	-21	07	-17	=07	-16	13
Emotional	-01	-18	-30	21	-10	02	-09	01
Ethical	-05	-01	-31	02	-04	-08	05	15
Aesthetic	-15	-21	-10	00	-23	-01	03	14
Voc. Guid.	-07	-62	00	10	03	-05	05	05
Voc. Prep.	-01	-74	02	01	03	-02	00	02
Home and Family	-03	-47	-07	-12	-12	-05	-12	01
Consumer	02	-48	-07	02	-17	-07	-04	-03
Eigenvalue	12.7	2.9	2.3	1.7	1.5	1.4	1.0	1.0
Percent of Component Variance	51.4	12.6	9.4	6.8	6.1	5.7	4.4	4.2

(Decimals Omitted)

TABLE VII

STRUCTURE MATRIX IMAGE
PROCEDURE FOR SECONDARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	-34	-36	-30	24	-23	-57	-28	52
Comm. of Know.	-40	-37	-35	45	-19	-57	-30	61
Creat. of Know.	-37	-37	-27	30	-25	-49	-21	56
Desire for Know.	-41	-31	-27	30	-19	-48	-24	57
Coop. in Day to Day Rel.	-56	-46	-45	43	-25	-42	-39	49
Man to State	-58	-50	-48	30	-30	-62	-50	60
Man to Country	-45	-39	-58	22	-37	-59	-59	50
Man to World	-57	-48	-33	30	-27	-51	-31	59
Physical	-33	-35	-56	26	-43	-44	-49	42
Emotional	-37	-49	-61	41	-44	-39	-47	40
Ethical	-41	-39	-61	28	-41	-49	-57	47
Aesthetic	-46	-56	-45	34	-50	-43	-34	47
Voc. Guid.	-50	-71	-32	40	-35	-44	-19	48
Voc. Prep.	-45	-73	-31	30	-40	-37	-20	39
Home and Family	-42	-61	-46	12	-52	-41	-40	36
Consumer	-38	-65	-45	24	-52	-41	-33	38

(Decimals Omitted)

TABLE VIII

COMPONENT CORRELATIONS IMAGE
PROCEDURE FOR SECONDARY RESPONSES

	1	2	3	4	5	6	7	8
1	1.00							
2	61	1.00						
3	41	46	1.00					
4	-28	-38	-37	1.00				
5	21	58	65	-01	1.00			
6	51	52	50	-33	34	1.00		
7	48	29	83	-15	42	51	1.00	
8	66	-53	-41	52	-34	-83	-35	1.00

(Decimals Omitted)

TABLE IX

DERIVED (NORMAL VARIMAX) PATTERN MATRIX IMAGE
PROCEDURE FOR ELEMENTARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	06	15	41	07	00	-04	-03	01
Comm. of Know.	19	07	38	11	03	11	02	-02
Creat. of Know.	16	23	18	18	01	17	01	-00
Desire for Know.	-16	15	23	18	20	01	-01	00
Coop. in Day to Day Rel.	-04	37	20	35	10	-05	-07	01
Man to State	17	42	33	15	-01	-02	12	01
Man to Country	03	48	30	07	07	-09	07	04
Man to World	19	15	21	38	01	04	03	-00
Physical	13	48	01	08	06	10	03	02
Emotional	15	46	10	13	-08	01	10	-02
Ethical	09	52	17	04	03	01	01	-02
Aesthetic	25	42	10	30	01	03	-01	-00
Voc. Guid.	65	14	05	10	05	-03	-04	00
Voc. Prep.	63	01	10	10	04	-01	-09	-00
Home and Family	46	20	03	-03	-10	10	14	-01
Consumer	60	16	05	03	-08	01	05	06
Eigenvalue	6.5	3.6	2.0	1.7	1.4	1.2	1.2	1.0
Percent of Component Variance	34.8	19.0	10.6	9.0	7.6	6.8	6.7	5.6

(Decimals Omitted)

TABLE X

DERIVED (OBLIMIN) PATTERN MATRIX IMAGE
PROCEDURE FOR ELEMENTARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	-06	-00	-41	-08	01	02	03	01
Comm. of Know.	02	-10	-35	07	-09	09	07	-10
Creat. of Know.	-11	-01	-12	05	-21	08	14	-04
Desire for Know.	00	02	-10	-05	-03	36	09	-00
Coop. in Day to Day Rel.	-20	-01	-05	-11	-01	20	26	-09
Man to State	-08	01	-19	-22	-02	00	18	-16
Man to Country	-08	-01	-18	-33	-03	11	02	-07
Man to World	-00	-05	-05	00	-03	04	45	-04
Physical	-22	-04	-08	-12	-24	17	00	-06
Emotional	-48	-03	-05	-01	-04	-03	06	-01
Ethical	-35	-01	-06	-14	-05	10	-08	-13
Aesthetic	-24	-10	09	-09	-06	03	28	-04
Voc. Guid.	-02	-67	05	-05	00	02	01	-02
Voc. Prep.	01	-69	-05	05	02	01	-00	07
Home and Family	-02	-19	00	-04	-15	-14	05	-22
Consumer	-03	-43	-02	-02	-10	-14	05	-11
Eigenvalues	8.5	3.7	1.9	1.6	1.5	1.3	1.2	1.0
Percent of Component Variance	10.5	17.8	9.0	8.0	6.9	6.4	6.1	4.9

(Decimals Omitted)

TABLE XI

STRUCTURE MATRIX IMAGE
PROCEDURE FOR SECONDARY RESPONSES

	1	2	3	4	5	6	7	8
Poss. of Know.	-29	-14	-49	-28	-18	32	32	-18
Comm. of Know.	-27	-31	-48	-17	-34	27	40	-31
Creat. of Know.	-39	-28	-35	-23	-43	28	43	-30
Desire for Know.	-29	-02	-37	-28	-20	49	33	-06
Coop. in Day to Day Rel.	-52	-16	-40	-43	-31	50	52	-13
Man to State	-50	-30	-47	-49	-41	33	48	-41
Man to Country	-52	-18	-44	-56	-34	42	40	-32
Man to World	-36	-33	-37	-22	-35	28	55	-24
Physical	-54	-25	-25	-42	-50	33	38	-36
Emotional	-56	-27	-28	-41	-40	25	40	-28
Ethical	-56	-21	-33	-50	-41	32	34	-35
Aesthetic	-54	-38	-27	-38	-46	26	52	-34
Voc.Guid.	-29	-68	-18	-11	-40	-06	38	-43
Voc. Prep.	-19	-65	-21	-01	-33	-08	35	-36
Home and Family	-26	-47	-15	-15	-44	-09	26	-51
Consumer	-28	-61	-18	-11	-44	-12	34	-50

(Decimals Omitted)

TABLE XII

COMPONENT CORRELATIONS IMAGE
PROCEDURE FOR ELEMENTARY RESPONSES

	1	2	3	4	5	6	7	8
1	1.00							
2	35	1.00						
3	39	27	1.00					
4	74	08	36	1.00				
5	64	55	31	27	1.00			
6	-44	13	-55	-45	-24	1.00		
7	-60	-53	-57	34	-55	48	1.00	
8	39	61	32	38	72	67	-32	1.00

(Decimals Omitted)

TABLE XIII

DERIVED (NORMAL VARIMAX) PATTERN MATRIX
ALPHA PROCEDURE FOR SECONDARY RESPONSES

	I	II	III	IV	H^2
Poss. of Know.	06	10	25	-08	08
Comm. of Know.	00	08	29	08	10
Creat. of Know.	06	05	26	01	07
Desire for Know.	03	03	32	06	10
Coop. in Day to Day Rel.	15	19	18	50	34
Man to State	15	22	31	06	17
Man to Country	09	48	26	-02	31
Man to World	16	05	26	08	10
Physical	06	34	08	04	13
Emotional	18	41	00	23	25
Ethical	08	39	18	08	20
Aesthetic	29	17	15	00	14
Voc. Guid.	48	00	15	15	28
Voc. Prep.	59	00	07	10	36
Home and Fam.	44	28	06	04	27
Consumer	41	21	04	-00	22
Eigenvalue	3.21	1.63	1.38	1.02	
Percent of Factor Variance	44.3	22.5	19.0	14.2	

(Decimals Omitted)

TABLE XIV

DERIVED (OBLIMIN) PATTERN MATRIX
ALPHA PROCEDURE FOR SECONDARY RESPONSES

	I	II	III	IV	H^2
Poss. of Know.	45	06	09	-22	29
Comm. of Know.	53	-09	08	11	31
Creat. of Know.	50	06	-01	-02	27
Desire for Know.	58	-03	-03	06	33
Coop. in Day to Day Rel.	16	09	25	60	58
Man to State	43	13	24	01	42
Man to Country	25	-06	61	-12	56
Man to World	44	23	-01	09	32
Physical	02	00	59	00	36
Emotional	-14	15	61	26	50
Ethical	17	-00	58	04	45
Aesthetic	16	44	16	-01	38
Voc. Guid.	14	67	-14	15	53
Voc. Prep.	00	80	-14	07	60
Home and Fam.	-05	59	28	-14	52
Consumer	-06	60	20	-07	47
Eigenvalue	10.36	2.66	1.91	1.06	
Percent Factor Variance	64.8	16.7	11.9	6.6	

(Decimals Omitted)

TABLE XV

STRUCTURE MATRIX ALPHA PROCEDURE
FOR SECONDARY RESPONSES

	I	II	III	IV
Poss. of Know.	49	21	28	-15
Comm. of Know.	54	12	26	16
Creat. of Know.	52	22	21	03
Desire for Know.	56	15	19	11
Coop. in Day to Day Rel.	36	34	39	65
Man to State	57	37	47	10
Man to Country	48	29	-70	-05
Man to World	51	38	25	17
Physical	26	24	60	05
Emotional	17	38	63	31
Ethical	40	28	65	10
Aesthetic	37	56	40	08
Voc. Guid.	32	69	18	27
Voc. Prep.	22	76	17	19
Home and Fam.	23	66	48	-03
Consumer	21	65	41	02

(Decimals Omitted)

TABLE XVI

FACTOR CORRELATIONS
ALPHA PROCEDURE FOR SECONDARY RESPONSES

	I	II	III	IV
I	1.00	33	39	11
II		1.00	39	16
III			1.00	07
IV				1.00

(Decimals Omitted)

TABLE XVII

DERIVED (NORMAL VARIMAX) PATTERN MATRIX
ALPHA PROCEDURE FOR THE ELEMENTARY RESPONSES

	I	II	III	IV	H^2
Poss. of Know.	-01	08	04	<u>31</u>	10
Comm. of Know.	13	08	11	<u>37</u>	17
Creat. of Know.	08	09	10	07	03
Desire for Know.	-10	05	14	12	05
Coop. in Day to Day Rel.	-07	24	<u>38</u>	09	22
Man to State	11	03	10	24	17
Man to Country	-01	37	05	23	19
Man to World	13	04	34	13	16
Physical	07	<u>33</u>	10	-02	13
Emotional	09	27	08	01	09
Ethical	03	<u>43</u>	03	11	20
Aesthetic	18	30	31	-01	22
Voc. Guid.	<u>47</u>	08	11	01	24
Voc. Prep.	<u>47</u>	-03	11	08	24
Home and Fam.	39	14	-05	01	14
Consumer	<u>56</u>	13	-01	04	<u>33</u>
Eigenvalue	2.99	1.92	1.42	1.15	
Percent Factor Variance	40.0	25.7	19.0	15.4	

(Decimals Omitted)

TABLE XVIII

DERIVED (OBLIMIN) PATTERN MATRIX
ALPHA PROCEDURE FOR ELEMENTARY RESPONSES

	I	II	III	IV	H^2
Poss. of Know.	10	-04	-54	01	32
Comm. of Know.	-08	19	-58	-10	41
Creat. of Know.	16	.15	-12	-20	18
Desire for Know.	06	-27	-21	-28	22
Coop. in Day to Day Rel.	26	-19	-01	-54	47
Man to State	41	11	-31	-06	41
Man to Country	56	-09	-28	03	44
Man to World	-07	16	-12	-56	40
Physical	55	06	14	-13	36
Emotional	48	11	04	-09	30
Ethical	65	-00	-09	04	45
Aesthetic	34	19	14	-44	47
Voc. Guid.	02	66	01	-14	49
Voc. Prep.	-16	67	-11	-15	49
Home and Fam.	22	54	-00	14	37
Consumer	11	73	-03	06	57
Eigenvalue	8.96	3.69	2.02	1.32	
Percent Factor Variance	56.0	23.1	12.6	8.3	

(Decimals Omitted)

TABLE XIX

STRUCTURE MATRIX ALPHA PROCEDURE
FOR ELEMENTARY RESPONSES

	I	II	III	IV
Poss. of Know.	22	00	-56	-19
Comm. of Know.	13	23	-60	-29
Creat. of Know.	29	22	-24	-32
Desire for Know.	16	-20	-30	-33
Coop. in Day to Day Rel.	43	-50	-25	-62
Man to State	54	22	-44	-33
Man to Country	60	03	-40	-25
Man to World	19	24	-29	-60
Physical	57	18	-04	-29
Emotional	53	22	-11	-27
Ethical	66	12	-24	-22
Aesthetic	51	31	-10	-55
Voc. Guid.	20	68	-08	-24
Voc. Prep.	05	67	-16	-23
Home and Fam.	28	57	-05	-02
Consumer	24	75	09	-09

(Decimals Omitted)

TABLE XX

FACTOR CORRELATIONS
ALPHA PROCEDURE FOR ELEMENTARY RESPONSES

	I	II	III	IV
I	1.00	19	-25	-36
II		1.00	-06	-14
III			1.00	32
IV				1.00

(Decimals Omitted)